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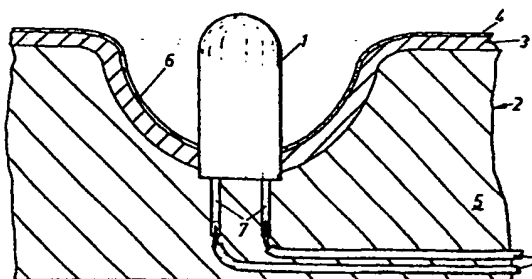
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(54) An arrangement in light-emitting diodes.

(57) An arrangement in light-emitting diodes comprising a reflector (6) which is formed in a holder (2). A light-emitting diode (1) is mounted in the holder and projects into the reflector through an opening. The light-emitting diode is attached by its two connections (7), the latter extending down into a filler substance (5). Two conductors (8) are coupled to the connections (7) and connect them to a power source.

The holder (2) consists of surface-treated sheet metal (3), preferably anodized aluminium. The reflector (6) is bowl-shaped and semi-spherical. Owing to the reflector a bundle of aligned beams of light is emitted from the light-emitting diode (1).

Fig.1



An Arrangement in Light-Emitting Diodes

The present invention concerns an arrangement in light-emitting diodes. The improved diode is suitable for use in a variety of different applications, such as for illumination of signs and for lighting purposes in cars, to mention only a few.

Light-emitting diodes have several advantages over conventional incandescent lamps. Light-emitting diodes have a long serviceable life. When lit they generate only very little heat and they require a minimum of energy from the source of power. In addition, they are small and easy to mount. Their operational reliability makes them suitable for use for instance in applications where intermittent light is desired. Their flexibility of mounting and of use in combination with the minimum energy consumption make light-emitting diodes very useful in a large number of cases and applications, where conventional electric bulbs are not very satisfactory.

The purpose of the subject invention is to make it possible to use light-emitting diodes with maximum power in a number of applications. This is achieved in accordance with the teachings of the subject invention in that the connections of the light-emitting diode extend into a filler substance which covers and surrounds the connections as well as the electric conductors connected to said connections, at least in the area of the connecting points between the connections and the electric conductors.

Further characteristics of the invention will appear from the dependent claims.

The light-emitting diode in accordance with the invention has excelling lighting properties. In addition the emitted light beam is aligned and concentrated.

The invention will be described in closer detail in the following with reference to the accompanying drawings, wherein

Fig. 1 is a cross-sectional view through a light-emitting diode in accordance with the invention,

Fig. 2 is a plan view of a practical application of the invention, and

Fig. 3 is a plan view of a further practical application of the invention.

Fig. 1 illustrates a light-emitting diode 1 which is positioned in a holder 2. The latter consists of a shell 3 of sheet metal. Preferably, the sheet metal is aluminium plates, which has been exposed to an anodizing treatment, whereby a reflective surface layer 4 forms on the plate. The sheet-metal shell 3 is filled with a suitable filler material 5. In the holder 2 are formed bowl-shaped, semi-spherical reflectors 6 in the centre of which the light-emitting diode 1 is positioned. The diode is attached in such a manner that its connections 7 extend into the filler material 5 through an opening in the reflector 6. The connections 7 are connected to a power source via conductors 8.

Because of the configuration of the reflector 6, the light emitted from the diode 1 will be reflected in the form of a bundle of aligned beams. The comparatively weak light emitted from a light-emitting diode will in this manner be strengthened with regard to its effect and power in a direction straight outwards from the reflector.

Figs. 2 and 3 show examples of suitable applications for a light-emitting diode in accordance with the invention. Fig. 2 illustrates a signalling mechanism 9 in the form of an elongate, rectangular holder 10 in which are formed a number of reflectors 6. In the manner shown in Fig. 1

one light-emitting diode 1 is mounted in each one of these reflectors. At each end of the holder a number of yellow light-emitting diodes 11 are provided. The light-emitting diodes 12 positioned intermediate the outermost groups 11 of light-emitting diodes are red. The holder is intended to be mounted for instance at the rear of cars, in which case the central red light-emitting diodes 12 serve as brake lights whereas the yellow light-emitting diodes 11 at each end of the holder serve as blinkers. A device of this kind could advantageously be mounted in the rear window of cars to supplement the conventional rear lights of the vehicle. In order to achieve the flashing function of the blinker diodes 11, a relay or similar means is coupled between the power source and the diodes.

A further example of an advantageous application for the light-emitting diode in accordance with the invention is shown in Fig. 3. On a conventional sign 13 the text or design areas are provided with reflectors 6 and light-emitting diodes. The latter are made to emit light continuously or to emit an intermittent light to illuminate the text or design. In this manner, the diodes may in the manner indicated cover the entire design to be illuminated or serve as outline-indicators.

The manner of positioning and mounting the diodes and their connections 7 and conductors 8 in the filler material 5 has the advantage of providing, in a simple and unexpensive manner, a completely tight seal against attacks from moisture and wetness as also against other harmful effects of wear and ageing to which the diode and its connections are otherwise exposed.

In addition to protecting the diodes and its connectors completely the attachment and mounting of the diodes in accordance with the subject invention have further advantages. For instance, because the diode may be pressed straight into the opening made in the reflector, mounting of the diode becomes easy. Furthermore, no mounting

components or accessories or special assembly tools are required to attach the diode, since the latter is retained in position by the synthetic resin substance, which is applied on the diode 1, the connections 7 and the electric
5 conductors 8 through spraying or brushing.

The embodiments of the invention shown and described herein are to be regarded as examples only and variety of modifications and embodiments are possible within the scope of the appended claims. It should be understood that
10 the invention has a much wider range of applications than those shown and described herein.

C l a i m s

1. An arrangement in light-emitting diodes, which are arranged to be mounted in reflectors (6) having a semi-spherical configuration, c h a r a c t e r i s e d i n
5 t h a t the connections (7) of the light-emitting diode (1) extend into a filler substance (5), which covers and surrounds the connections (7) as well as the electric conductors (8) connected to said connectors, at least in the area of the connecting points between the connections (7)
10 and the electric conductors (8).

2. An arrangement as claimed in claim 1, c h a r a c t e r i s e d i n t h a t the reflectors (6) are formed in a pattern in surface-finished sheet metal.

3. An arrangement as claimed in claim 1 or 2,
15 c h a r a c t e r i s e d i n t h a t the reflectors (6) are formed in an anodized aluminium sheet metal plate.

4. An arrangement as claimed in any one of the preceding claims, c h a r a c t e r i s e d i n t h a t the electric conductors (8) are moulded into the filler substance (5) along their entire extension along the rear
20 face of a sheet metal shell (3) in which the reflectors (6) are formed.

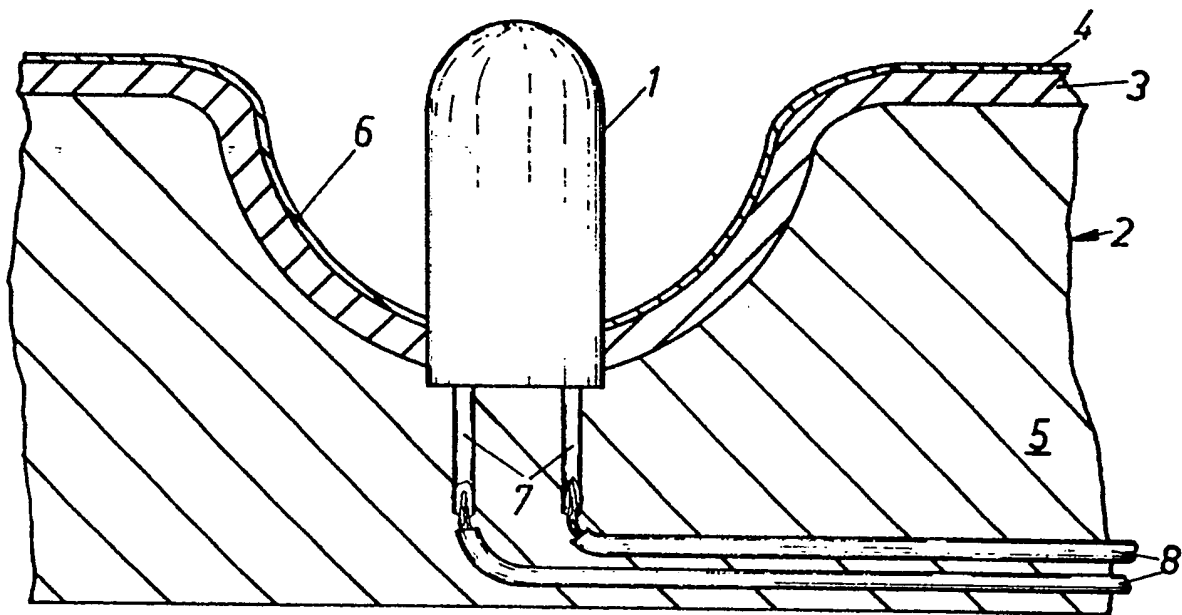
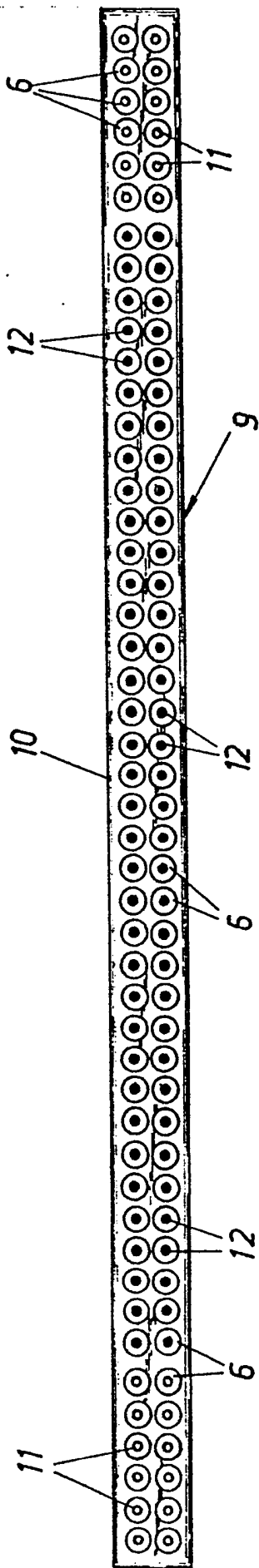
Fig.1

Fig. 2



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Fig.3

